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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

WHIPKEY, JASON T

ART UNIT	PAPER NUMBER
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2612

DATE MAILED: 12/04/2003

11

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/391,411

Applicant(s)

SATO ET AL.

Examiner

Jason T. Whipkey

Art Unit

2612

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7,9-19 and 22-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-19 and 22-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1 and 13 have been considered but are moot in view of the new ground of rejection.

Drawings

2. The replacement drawing sheet was received on October 17, 2003. This change is approved. The drawing objections are withdrawn.

Specification

3. The amendment to the specification is approved and the corresponding objection is withdrawn.

Claim Objections

- ✓4. Claim 5 is objected to because it contains two typographical errors. The Applicant should amend line 3 to change it from "a low pass *inter* configured to reject a *frequency* band" to -- a low pass filter configured to reject a frequency band --.

Appropriate correction is required.

- ✓5. Claim 12 is objected to as failing to comply with 37 C.F.R. § 1.75(a) for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites the limitation "the tilt angles" on line 3. There is insufficient antecedent basis for this limitation in the claim. For examination purposes, the claim will be treated as if it reads, "the rotation angles".

Claim Rejections - 35 U.S.C. § 112

6. The amendment to the claims to overcome the rejections under 35 U.S.C. § 112, second paragraph, is approved and the corresponding rejection is withdrawn.

Claim Rejections - 35 U.S.C. § 103

7. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 C.F.R. § 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. § 103(c) and potential 35 U.S.C. §§ 102(e), (f) or (g) prior art under 35 U.S.C. § 103(a).

9. Claims 1, 2, 10, 12-14, 22, and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagasaki (U.S. Patent No. 5,155,520) in view of Yamasaki (U.S. Patent No. 5,365,303).

Regarding claims 1 and 13, Nagasaki discloses a camera that prevents imaging errors caused by camera shake (column 2, lines 46-51). As shown in Figure 1A, displacement detectors 6a-6e ("a shaking detector") detects camera shake in response to the output of acceleration sensors x1, x2, x3, y1, and y2 (column 7, lines 44-56). Figure 2 shows that these sensors are located on coordinate axes of the camera. Rotational displacement detector 11 ("a calculator") calculates rotational displacement angle θ in the x and y directions using the sensor outputs (column 7, lines 62-66). The system includes an actuator ("a deviation correction device") "for displacing at least one of the photographing optical lens ["a positionable optical element"] and the imaging surface ["an image pickup device"] ... thereby correcting positional errors of the object image formed on the imaging surface" (column 2, line 18-22). For example, Figure 1A shows actuator driver 10a ("a rotation regulator") configured to control θ -actuator 3a to rotate image pickup element 2 around the optical axis (column 7, lines 56-61).

Nagasaki is silent with regard to using angular velocity sensors to detect camera shaking.

Yamasaki discloses a shake-control device for an imaging system. Figure 3 shows a camera with shake-detection means 13 (column 7, lines 4-15). Shake-detection means 13 is comprised of angle sensors 13a and 13b (column 7, lines 13-15). Acceleration sensors or angular velocity sensors may be used in place of angle sensors 13a and 13b (column 7, lines 54-57).

An advantage to using an angular velocity sensor instead of an acceleration sensor is that the calculations of the position of the lens and image sensor may be simplified, which requires fewer computations and therefore a lower hardware cost. For this reason, it would have been obvious at the time of invention to have Nagasaki's camera include angular velocity sensors.

Regarding claims 2, 10, 14, and 22, Nagasaki teaches that the photographing optical lens is moved to correct positional errors of the object image (column 2, lines 18-22).

Regarding claim 12 and 24, Nagasaki teaches that the actuator mechanism is driven to move image pickup element 2 to correct for image displacement (column 8, lines 54-59).

10. Claims 3, 4, 6, 11, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagasaki in view of Yamasaki and further in view of Onuki (U.S. Patent No. 5,335,032).

Claims 3 and 4 may be treated like claim 1. However, Nagasaki is silent with regard to including an angular velocity sensor on an optical axis.

Onuki discloses an image stabilizing apparatus (Figure 3) with angular acceleration meters 1i and 1j for detecting the angular vibrations of optical axis C. The signals from these meters are integrated by integrator INTEG, shown in Figure 1, to produce an angular velocity calculation (column 6, lines 47-50).

Onuki is silent with regard to using an angular velocity sensor instead of angular acceleration meters to produce angular velocity calculations. However, an advantage to doing so is that fewer parts would be necessary to make the camera. For this reason, it would have been obvious at the time of invention for Onuki to substitute angular velocity sensors for angular acceleration meters and integrators.

An advantage to including motion sensors on an optical axis is that an optical axis is the most susceptible to motion, as it is the line of sight for photography. Measuring movement along this axis would allow the camera to correct for more shaking. For this reason, it would have been obvious at the time of invention for Nagasaki to include motion sensors on the optical axis of his camera, such as the ones described by Onuki.

Regarding claim 6, Nagasaki shows in Figure 2 that sensor x3 is oriented horizontally.

Claims 11 and 23 may be treated like claims 1 and 13, respectively. Additionally, Nagasaki teaches that a moveable prism may be used to correct for rotational

displacement (column 10, lines 40-44). However, Nagasaki is silent with regard to specifically using a variable-angle prism to correct for image shaking.

Onuki discloses that a variable-angle prism may be used to correct angular displacement caused by vibration (column 14, lines 52-58). An advantage to using a variable-angle prism is that it can prevent the focal point of a lens from moving (the result of excessive shaking), which causes the image to lose focus. For this reason, it would have been obvious at the time of invention to have Nagasaki's system include a variable-angle prism for image shaking correction.

11. Claims 5 and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagasaki in view of Yamasaki and further in view of Miyazawa (U.S. Patent No. 5,331,365).

Claims 5 and 15 may be treated like claims 1 and 14, respectively. However, Nagasaki is silent with regard to including a low-pass filter to remove a frequency band over 20 Hz from the outputs of the angular velocity sensors.

Miyazawa discloses a camera shaking detection apparatus with the circuitry shown in Figure 4. The circuitry includes low-pass filter 26, which removes shaking signal components with a frequency of more than 20 Hz (column 4, lines 51-53). As stated in column 5, lines 3-8, the advantage to removing frequencies greater than 20 Hz is that interference may be removed. For this reason, it would have been obvious at the time of invention to have Nagasaki include a low-pass filter that removes shaking signal

components with a frequency of more than 20 Hz, such as the one described by Miyazawa.

12. Claims 7 and 16-19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagasaki in view of Yamasaki and further in view of Miyazawa and Onuki.

Claims 7 and 16 may be treated like claims 5 and 15, respectively. However, Nagasaki is silent with regard to including two angular velocity sensors on an optical axis of the camera.

Onuki discloses an image stabilizing apparatus (Figure 3) with angular acceleration meters 1i and 1j for detecting the angular vibrations of optical axis C. Both acceleration meters sense acceleration in horizontal and vertical directions (column 8, lines 2-8). The signals from these meters are integrated by integrator INTEG, shown in Figure 1, to produce an angular velocity calculation (column 6, lines 47-50).

Onuki is silent with regard to using an angular velocity sensor instead of angular acceleration meters to produce angular velocity calculations. However, an advantage to doing so is that fewer parts would be necessary to make the camera. For this reason, it would have been obvious at the time of invention for Onuki to substitute angular velocity sensors for angular acceleration meters and integrators.

An advantage to including motion sensors on an optical axis is that an optical axis is the most susceptible to motion, as it is the line of sight for photography. Measuring movement along this axis would allow the camera to correct for more shaking. For this reason, it would have been obvious at the time of invention for

Nagasaki to include motion sensors on the optical axis of his camera, such as the ones described by Onuki.

Regarding claim 17, Nagasaki shows in Figure 2 that sensors x1 and x2 are on an axis that is parallel to the optical axis.

Regarding claim 18, Nagasaki shows in Figure 2 that sensor x3 is on an axis that is on a horizontal axis.

Regarding claim 19, Nagasaki shows in Figure 2 that sensors x1 and x2 detect horizontal movement and sensors y1 and y2 detect vertical movement.

13. Claim 9 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagasaki in view of Yamasaki and further in view of Onuki and Miyazawa.

Claim 9 may be treated like claim 1. However, Nagasaki is silent with regard to including a low-pass filter to remove a frequency band over 20 Hz from the outputs of the angular velocity sensors.

Miyazawa discloses a camera shaking detection apparatus with the circuitry shown in Figure 4. The circuitry includes low-pass filter 26, which removes shaking signal components with a frequency of more than 20 Hz (column 4, lines 51-53). As stated in column 5, lines 3-8, the advantage to removing frequencies greater than 20 Hz is that interference may be removed. For this reason, it would have been obvious at the time of invention to have Nagasaki include a low-pass filter that removes shaking signal components with a frequency of more than 20 Hz, such as the one described by Miyazawa.

Conclusion

14. Applicant's amendment necessitated the new ground of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 § C.F.R. 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 C.F.R. § 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason T. Whipkey, whose telephone number is (703) 305-1819. The examiner can normally be reached Monday through Friday from 8:30 A.M. to 6:00 P.M. eastern standard time, alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy R. Garber, can be reached on (703) 305-4929. The fax phone number for the organization where this application is assigned is (703) 872-9306.


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Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center 2600 Customer Service Office, whose telephone number is (703) 306-0377.

JTW

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November 26, 2003


WENDY R. GARBER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600